

Supplemental Material

Appendix A. Definitions

Table S1. Variable Definitions	
Variable	Definition
Depression	The number of events after the index date where the mother has <ul style="list-style-type: none"> A hospitalization with ICD-9-CM diagnosis code 296·2-296·3, 296·5, 300·4, 309, and 311 or ICD-10-CA diagnosis codes F31·3-F31·5, F32, F33, F341, F380, F381, F432, F438, and F530 OR A physician visit with a ICD-9-CM diagnosis code 309, 311.¹
Anxiety	The number of events after the index date where the mother has <ul style="list-style-type: none"> A hospitalization with ICD-9-CM diagnosis code 300·0, 300·2, 300·3 or ICD-10-CA diagnosis codes F40, F41·0, F41·1, F41·3, F41·8, F41·9, F42, F431 OR A physician visit with a ICD-9-CM diagnosis code 300.¹
Substance Use Disorders	The number of events after the index date where the mother has <ul style="list-style-type: none"> A hospitalization with ICD-9-CM codes 291, 292, 303, 304, 305 or ICD-10-CA diagnosis code F10-F19, F55 OR A physician visit with ICD-9-CM diagnosis code 291, 292, 303, 304, 305.²
Physician visits for mental illness	The number of ambulatory visits to a physician after the index date for a mental health related condition, identified by any diagnosis from Chapter 5 (Mental Disorders) in the ICD-9-CM code book (ICD-9-CM codes 290 – 319). ³
Hospitalizations for mental illness	The number of hospitalizations (of at least one day) after the index date for a mental health related condition, where the primary diagnosis is for a mental health condition, which is identified by any diagnosis from Chapter 5 (Mental Disorders) in the ICD-9-CM code book or the ICD-10-CA code book.
Psychotropic prescription	The number of psychotropic prescriptions filled by each mother after the index date. These are all prescriptions that fall under antidepressants (ATC codes N06AA, N06AB, N06AX), antipsychotics (N05A), and Anxiolytics and sedatives (ATC codes N05BA, N05BB, N05B#, N05CF, N05CD) ⁴
Low Income	Low income neighborhoods are defined as living in a neighborhood having an income in the lowest quintile. Income quintile is a measure of neighbourhood socioeconomic status that divides the population into 5 income groups (from lowest income to highest income) so that approximately 20% of the population is in each group. ⁵
Received EIA	If in the two years before the index date, the mother receives at least two consecutive months of EIA ⁶ .
Moved	If in the two years before the index date, the mother moves at least once. Moving is defined by a change in six-digit postal code.

Appendix B. Balancing of Covariates for IPTWs

Separate models were used to obtain high dimensional propensity scores (HDPS) for each outcome. The balance of the selected variables were tested for each outcome using standardized differences.

Depression

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of depression diagnoses after the index date had 936 mothers who experienced the death of a child and 4,439 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S2 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

	Mothers who had a Child taken into care (n = 4,439)	Mothers who Experienced the Death of a Child (n = 936)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1298 (29.24)	129 (13.78)	0.38	0.09
20 – 29	2362 (53.21)	533 (56.94)	0.08	0.04
≥ 30	779 (17.55)	274 (29.27)	0.28	0.06
Child is Younger than 1	1998 (45.01)	754 (80.56)	0.79	0.27
Birth Order of Child				
1	3579 (80.63)	527 (56.30)	0.54	0.01
2	567 (12.77)	241 (25.75)	0.33	0.08
3	183 (4.12)	96 (10.26)	0.24	0.11
4+	110 (2.48)	72 (7.69)	0.25	0.01
Lived in a Low Income Neighborhood	2244 (50.55)	320 (34.19)	0.34	0.01
Urban Neighborhood	2540 (57.22)	457 (48.82)	0.17	0.15
Maternal Event in the 2 years before the index date				
Changed Residence	2272 (51.18)	357 (38.14)	0.26	0.37
Received EIA (Welfare)	2474 (55.73)	157 (16.77)	0.88	0.04
Maternal Health in the 2 years before the Index Date				
Tylenol Regular Strength 325mg	430 (9.69)	34 (3.63)	0.24	0.09
Office Visit or Subsequent Visit or Well Baby Care	858 (19.33)	128 (13.68)	0.15	0.12
Consultation	985 (22.19)	374 (39.96)	0.39	0.17
Depressive Disorder	199 (4.48)	20 (2.14)	0.13	0.14
Hematology, Hemoglobin(Photoelectric)	518 (11.67)	202 (21.58)	0.27	0.07
PMS-Amoxicillin	767 (17.28)	115 (12.29)	0.14	0.17
Cytological Examination, Vaginal Smear	390 (8.79)	162 (17.31)	0.26	0.14
Tylenol with Codeine No.4	358 (8.06)	34 (3.63)	0.19	0.01
Biochemistry, Glucose, Quantitative	659 (14.85)	229 (24.47)	0.24	0.14
Neurotic Disorders	226 (5.09)	22 (2.35)	0.14	0.03

Anxiety

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of anxiety diagnoses after the index date had 902 mothers who experienced the death of a child and 4,005 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S3 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

Table S3. Comparison of Baseline Characteristics; Anxiety Outcome				
	Mothers who had a Child taken into care (n = 4,005)	Mothers who Experienced the Death of a Child (n = 902)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1168 (29.16)	130 (14.41)	0.36	0.03
20 – 29	2089 (52.16)	508 (56.32)	0.08	0.17
≥ 30	748 (18.68)	264 (29.27)	0.25	0.20
Child is Younger than 1	1901 (47.47)	721 (79.93)	0.72	0.24
Birth Order of Child				
1	3205 (80.02)	511 (56.65)	0.52	0.09
2	529 (13.21)	233 (25.83)	0.32	0.16
3	167 (4.17)	90 (9.98)	0.23	0.13
4+	104 (2.60)	68 (7.54)	0.23	0.01
Lived in a Low Income Neighborhood	1998 (49.89)	320 (35.48)	0.29	0.01
Urban Neighborhood	2269 (56.65)	446 (49.45)	0.14	0.08
Maternal Event in the 2 years before the index date				
Changed Residence	1998 (49.89)	347 (38.47)	0.23	0.01
Received EIA (Welfare)	2115 (52.81)	157 (17.41)	0.80	0.10
Maternal Health in the 2 years before the Index Date				
Tylenol Regular Strength 325mg	332 (8.29)	33 (3.66)	0.20	0.01
Tylenol with Codeine No.4	283 (7.07)	34 (3.77)	0.15	0.08
Office Visit or Subsequent Visit or Well Baby Care	723 (18.05)	120 (13.30)	0.13	0.01
Neurotic Disorders	182 (4.54)	20 (2.22)	0.13	0.07
PMS-Amoxicillin	639 (15.96)	111 (12.31)	0.11	0.05
Known or suspected fetal abnormality affecting management of mother	98 (2.45)	110 (12.20)	0.39	0.07
Acute Upper Respiratory Infections	324 (8.09)	46 (5.10)	0.12	0.08
Nu-Ibuprofen Tab 600mg	333 (8.31)	35 (3.88)	0.19	0.07
Prenavite Tablets	297 (7.42)	29 (3.22)	0.19	0.01
Depressive Disorder	269 (6.72)	36 (3.99)	0.12	0.08

Substance Use

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of substance use diagnoses after the index date had 936 mothers who experienced the death of a child and 4,080 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S4 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

Table S4. Comparison of Baseline Characteristics; Substance Use Outcome				
	Mothers who had a Child taken into care (n = 4,080)	Mothers who Experienced the Death of a Child (n = 936)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1192 (29.22)	129 (13.78)	0.38	0.01
20 – 29	2138 (52.40)	526 (56.20)	0.08	0.12
≥ 30	750 (18.38)	281 (30.02)	0.27	0.15
Child is Younger than 1	1910 (46.81)	756 (80.77)	0.76	0.31
Birth Order of Child				
1	3267 (80.07)	519 (55.45)	0.55	0.04
2	537 (13.16)	247 (26.39)	0.34	0.10
3	171 (4.19)	96 (10.26)	0.24	0.11
4+	105 (2.57)	74 (7.91)	0.24	0.01
Lived in a Low Income Neighborhood	2040 (50.00)	325 (34.72)	0.31	0.03
Urban Neighborhood	2308 (56.57)	454 (48.50)	0.16	0.16
Maternal Event in the 2 years before the index date				
Changed Residence	2055 (50.37)	352 (37.61)	0.25	0.08
Received EIA (Welfare)	2166 (53.09)	160 (17.09)	0.81	0.16
Maternal Health in the 2 years before the Index Date				
Known or suspected fetal abnormality affecting management of mother	97 (2.38)	112 (11.97)	0.38	0.06
Tylenol Regular Strength 325mg	353 (8.65)	35 (3.74)	0.20	0.03
Tylenol with Codeine No.4	304 (7.45)	35 (3.74)	0.16	0.13
Dynamic Ultrasound Foetal Risk Subsequent Assessment	121 (2.97)	83 (8.87)	0.25	0.07
Neurotic Disorders	192 (4.71)	22 (2.35)	0.13	0.08
Office Visit or Subsequent Visit or Well Baby Care	760 (18.63)	129 (13.78)	0.13	0.01
Nu-Ibuprofen 600mg	362 (8.87)	36 (3.85)	0.21	0.10
Prenavite Tablets	308 (7.55)	29 (3.10)	0.20	0.07
Consultation	903 (22.13)	381 (40.71)	0.41	0.21
Infertility, Female	16 (0.39)	27 (2.88)	0.20	0.03

Physician Visits for Mental Illness

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of physician visits for mental illness after the index date had 932 mothers who experienced the death of a child and 4,564 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S5 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

Table S5. Comparison of Baseline Characteristics; Physician Visits for Mental Illness Outcome				
	Mothers who had a Child taken into care (n = 4,564)	Mothers who Experienced the Death of a Child (n = 932)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1331 (29.16)	131 (14.06)	0.37	0.09
20 – 29	2423 (53.09)	525 (56.33)	0.07	0.05
≥ 30	810 (17.75)	276 (29.61)	0.28	0.17
Child is Younger than 1	2034 (44.57)	751 (80.58)	0.80	0.38
Birth Order of Child				
1	3699 (81.05)	527 (56.55)	0.55	0.14
2	568 (12.45)	238 (25.54)	0.34	0.10
3	187 (4.10)	93 (9.98)	0.23	0.11
4+	110 (2.41)	74 (7.94)	0.25	0.01
Lived in a Low Income Neighborhood	2336 (51.18)	324 (34.76)	0.34	0.12
Urban Neighborhood	2637 (57.78)	457 (49.03)	0.18	0.16
Maternal Event in the 2 years before the index date				
Changed Residence	2357 (51.64)	351 (37.66)	0.28	0.33
Received EIA (Welfare)	2570 (56.31)	156 (16.74)	0.90	0.10
Maternal Health in the 2 years before the Index Date				
Tylenol Regular Strength 325mg	464 (10.17)	34 (3.65)	0.26	0.09
Office Visit or Subsequent Visit or Well Baby Care	896 (19.63)	123 (13.20)	0.17	0.08
Neurotic Disorders	255 (5.59)	22 (2.36)	0.17	0.14
Tylenol with Codeine No.4	389 (8.52)	35 (3.76)	0.20	0.14
PMS-Amoxicillin	816 (17.88)	112 (12.02)	0.16	0.37
Cytological Examination, Vaginal Smear	408 (8.94)	154 (16.52)	0.23	0.16
Biochemistry, Glucose, Quantitative	668 (14.64)	234 (25.11)	0.26	0.28
Hematology, Hemoglobin (Photoelectric)	532 (11.66)	202 (21.67)	0.27	0.22
Acute Upper Respiratory Infections	396 (8.68)	47 (5.04)	0.14	0.08
Depressive Disorder	212 (4.65)	23 (2.47)	0.12	0.22

Hospitalizations for Mental Illness

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of hospitalizations for mental illness after the index date had 936 mothers who experienced the death of a child and 4,663 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S6 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

Table S6. Comparison of Baseline Characteristics; Hospitalizations for Mental Illness Outcome				
	Mothers who had a Child taken into care (n = 4,663)	Mothers who Experienced the Death of a Child (n = 936)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1354 (29.04)	130 (13.89)	0.38	0.19
20 – 29	2490 (53.40)	526 (56.20)	0.06	0.38
≥ 30	819 (17.56)	280 (29.91)	0.29	0.28
Child is Younger than 1	2062 (44.22)	753 (80.45)	0.81	0.42
Birth Order of Child				
1	3793 (81.34)	537 (57.37)	0.54	0.14
2	576 (12.35)	231 (24.68)	0.32	0.11
3	184 (3.95)	94 (10.04)	0.24	0.15
4+	110 (2.36)	74 (7.91)	0.25	0.04
Lived in a Low Income Neighborhood	2385 (51.15)	319 (34.08)	0.35	0.13
Urban Neighborhood	2723 (58.63)	464 (49.57)	0.18	0.01
Maternal Event in the 2 years before the index date				
Changed Residence	2430 (52.11)	352 (37.61)	0.29	0.02
Received EIA (Welfare)	2668 (57.22)	157 (16.77)	0.92	0.44
Maternal Health in the 2 years before the Index Date				
Known or suspected fetal abnormality affecting management of mother	104 (2.23)	111 (11.86)	0.38	0.06
Tylenol Regular Strength 325mg	511 (10.96)	35 (3.74)	0.28	0.14
Office Visit or Subsequent Visit or Well Baby Care	963 (20.65)	126 (13.46)	0.19	0.21
Consultation-Unassigned Patient	1012 (21.70)	385 (41.13)	0.42	0.65
Tylenol with Codeine No.4	393 (8.43)	34 (3.63)	0.20	0.14
Prenavite Tablets	366 (7.85)	30 (3.21)	0.20	0.16
PMS-Amoxicillin	847 (18.16)	112 (11.97)	0.17	0.38
Psychotherapy by Psychiatrist	100 (2.14)	8 (0.85)	0.11	0.16
Depressive Disorder	338 (7.25)	37 (3.95)	0.14	0.16
Neurotic Disorder	605 (12.97)	68 (7.26)	0.19	0.23

Psychotropic Prescriptions

Propensity scores were trimmed at the 2.5th and 97.5th percentile; the trimmed cohort used to examine the number of psychotropic prescriptions after the index date had 936 mothers who experienced the death of a child and 4,401 mothers who had a child taken into care.

Standardized differences were used to assess the effect of the IPTW on the mean differences. Table S7 presents these standardized differences for the sociodemographic variables and the top 10 health variables (as selected by the HDPS – standardized differences for all health are available upon request).

Table S7. Comparison of Baseline Characteristics; Psychotropic Prescriptions Outcome				
	Mothers who had a Child taken into care (n = 4,401)	Mothers who Experienced the Death of a Child (n = 936)	Unweighted Standardized Differences	IPT Weighted Standardized Differences
Characteristics at the Index Date	n (%)	n (%)		
Age of Mother				
< 20	1308 (29.72)	131 (14.00)	0.39	0.07
20 – 29	2328 (52.90)	530 (56.62)	0.07	0.06
≥ 30	765 (17.38)	275 (29.38)	0.29	0.01
Child is Younger than 1	2021 (45.92)	755 (80.66)	0.77	0.41
Birth Order of Child				
1	3561 (80.91)	529 (56.52)	0.54	0.07
2	554 (12.59)	241 (25.75)	0.34	0.02
3	179 (4.07)	92 (9.83)	0.23	0.08
4+	107 (2.43)	74 (7.91)	0.25	0.01
Lived in a Low Income Neighborhood	2234 (50.76)	318 (33.97)	0.34	0.12
Urban Neighborhood	2549 (57.92)	461 (49.25)	0.17	0.18
Maternal Event in the 2 years before the index date				
Changed Residence	2259 (51.33)	352 (37.61)	0.38	0.31
Received EIA (Welfare)	2431 (55.24)	157 (16.77)	0.87	0.01
Maternal Health in the 2 years before the Index Date				
Known or suspected fetal abnormality affecting management of mother	104 (2.36)	109 (11.65)	0.37	0.08
Tylenol Regular Strength 325mg	427 (9.70)	34 (3.63)	0.24	0.09
Office Visit or Subsequent Visit or Well Baby Care	841 (19.11)	127 (13.57)	0.15	0.17
Tylenol with Codeine No.4	347 (7.88)	34 (3.63)	0.18	0.07
Neurotic Disorders	215 (4.89)	22 (2.35)	0.14	0.16
PMS-Amoxicillin	766 (17.41)	113 (12.07)	0.15	0.29
Nu-Ibuprofen 600mg	400 (9.09)	35 (3.74)	0.22	0.18
Depressive Disorder	202 (4.59)	23 (2.46)	0.12	0.20
Prenavite Tablets	349 (7.93)	29 (3.10)	0.21	0.19
Teva-Naproxen	312 (7.09)	43 (4.59)	0.11	0.10

Appendix C. Discordant Sibling Analysis

To control for unmeasured stable family characteristics shared by siblings, we compared mental illness outcomes between sisters who experienced different types of loss using a sub-cohort of discordant sisters. This limited the sample to families in which at least one sister had a child taken into care (but did not experience the death of a child) and one sister experienced the death of a child (but did not have a child taken into care). In families where more than one sister had a child taken into care or experienced the death of a child, one such sister was randomly selected. The cohort consisted of sisters from 57 families, where 57 sisters had a child taken into care and 57 sisters experienced the death of a child.

Incident Rate Ratios (IRRs) for each outcome were obtained from family fixed-effects Poisson regression models. These models were adjusted for the sociodemographic variable included in the population analysis, as well as whether the mother had a depression, anxiety, or substance use diagnosis in the two years before the index date. The use of discordant siblings reduced the potential for confounding, as this approach helps account for shared familial characteristics, environment, and genetic predisposition.⁷ Again, the log of the total number of person-years at risk was included as an offset to ensure the modelling of relative rate as opposed to a relative count of events.

Table S8. Characteristics of Mothers Losing a Child, Discordant Sisters Sub-Cohort		
	Mothers who had a Child taken into care (n = 57)	Mothers who Experienced the Death of a Child (n = 57)
	n (%)	n (%)
Characteristics at the Index Date		
Age of Mother		
< 20	*	17 (29.82)
20 - 29	45 (78.95)	33 (57.89)
≥ 30	<6 *	7 (12.28)
Child is Younger than 1	15 (26.32)	52 (91.23)
Birth Order of Child		
1	39 (68.42)	16 (28.07)
2	11 (19.30)	27 (47.37)
3	<6 *	*
4+	<6 *	<6 *
Lived in a Low Income Neighborhood	32 (56.14)	37 (64.91)
Urban Neighborhood	21 (36.84)	14 (24.56)
Maternal Event in the 2 years before the index date		
Changed Residence	22 (38.60)	21 (36.84)
Received EIA (Welfare)	30 (52.63)	24 (42.11)
Depression Diagnosis	10 (17.54)	<6 *
Anxiety Diagnosis	20 (35.09)	16 (28.07)
Substance Use Diagnosis	7 (12.28)	<6 *

* Suppressed to ensure privacy

Sisters who had a child taken into care had significantly greater (at $p < 0.05$) adjusted relative rates of psychotropic prescriptions.

Table S9. Rates and Adjusted Incident Rate Ratios of Outcomes among Mothers Losing a Child, Discordant Sisters Sub-Cohort				
Outcomes	Rate per 100-person years		Adjusted * Incident Rate Ratios (95% CI)	P
	Mothers who had a Child was taken into care	Mothers who experienced the death of a child		
Diagnoses				
Depression	35.10	39.20	0.69 (0.28-1.70)	0.4198
Anxiety	83.73	51.17	1.54 (0.81-2.92)	0.1835
Substance Use	32.84	5.39	4.41 (1.36-14.37)	0.0137
Treatment Use				
Physician Visit for Mental Illness	114.06	73.91	1.29 (0.74-2.25)	0.3610
Hospitalization for Mental Illness	1.00	0.60	1.68 (0.17-16.82)	0.6610
Psychotropic Prescriptions	733.77	248.67	4.68 (1.65-13.26)	0.0037
*Adjusted for all covariates listed in Table S8				

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Appendix D. Comparisons of Rates with Mothers in the General Population

The mental health outcomes of mothers whose children were taken into care were compared with mothers whose children were not taken into care. Mothers whose children were not taken into care were initially matched up to 3:1 to mothers whose children were taken into care (Group 1) on mother's age (<18, 18-24, 25-29, 30-34, 35+), income quintile (1 (lowest income), 2, 3, 4, 5 (highest income)) and location of neighborhood (urban, rural south, rural mid, rural north) at birth of child, and child's birth order (1, 2, 3, 4+). The index date for mothers in Group 2 is the date their child was the age that their matched mothers' child was when taken into care. Of the remaining matches, one was randomly selected to remain in the cohort.

Figure S1. Cohort Selection for General Population Comparison

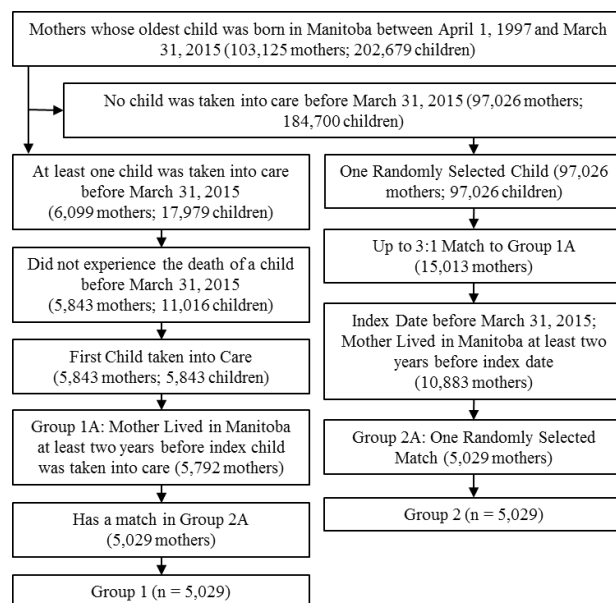


Table S10 highlights the significantly higher rates (per 100-person years) of each outcome when compared with mothers in the general population; there were 40 additional depression diagnoses, 53 additional anxiety diagnoses, 32 additional substance use diagnoses, 102 additional physician visits for mental illness, 3 additional hospitalizations for mental illness, and 624 additional psychotropic prescriptions per 100-person years among mothers whose children were taken into care.

Table S10. Rates of Outcomes per 100-person years among Mothers who did and did not have Child Taken into Care			
Outcome	Incidence Rate per 100 person-years		Rate Difference (per 100 person-years)
	Mothers who had a Child was taken into care (n = 5,029)	Mothers who did not have Child taken into Care (n = 5,029)	
Diagnoses			
Depression	66.02	25.86	40.16
Anxiety	83.10	30.10	53.00
Substance Use	39.06	6.40	32.66
Treatment Use			
Physician Visit for Mental Illness	158.33	55.73	102.60
Hospitalization for Mental Illness	4.00	0.38	3.62
Psychotropic Prescriptions	769.60	144.68	624.93

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